

CLAIMS

What is claimed is:

1 1. A vibration isolator which isolates a load
2 that is separated from a floor, comprising:
3 an active isolator assembly that provides active
4 isolation of the load in a first direction; and,
5 a passive isolator assembly that provides passive
6 isolation of the load in a second direction.

1 2. The vibration isolator of claim 1, wherein the
2 first direction is parallel with a vertical axis and
3 the second direction is parallel with a horizontal axis
4 of the load.

1 3. The vibration isolator of claim 1, wherein
2 said passive isolator assembly includes a pendulum
3 assembly.

1 4. The vibration isolator of claim 3, wherein
2 said pendulum assembly includes a cable that is coupled
3 to the load.

1 5. The vibration isolator of claim 4, wherein
2 said passive isolator assembly includes a dashpot that
3 is coupled to said pendulum assembly and the floor.

1 6. The vibration isolator of claim 1, wherein
2 said active isolator assembly includes an actuator that
3 is coupled to the load and the floor.

1 7. The vibration isolator of claim 6, wherein
2 said active isolator assembly includes a sensor that
3 senses a movement of a point between the load and the
4 housing, and a controller which is coupled to said
5 actuator and said sensor and which provides a drive
6 signal to said actuator in response to a feedback
7 signal from said sensor.

1 8. The vibration isolator of claim 7, wherein
2 said drive signal is a function of a transfer function
3 and said transfer function is selectable from a
4 plurality of different transfer functions.

1 9. The vibration isolator of claim 7, wherein
2 said sensor has a center axis that is coaxial with a
3 center axis of said actuator.

1 10. The vibration isolator of claim 1, further
2 comprising a filter assembly that is coupled to said
3 active isolator assembly and the load.

1 11. The vibration isolator of claim 10, wherein
2 said filter assembly includes a profiled elastomer that
3 is located within a profiled cavity of a coupler plate,
4 so that a resonant frequency of said filter assembly is
5 essentially constant for a predetermined range of loads
6 applied to said filter assembly.

1 12. The vibration isolator of claim 11, wherein
2 said profiled elastomer and profiled cavity each have a
3 conical shape.

1 13. The vibration isolator of claim 1, further
2 comprising a docking assembly that secures the load
3 relative to the housing.

1 14. The vibration isolator of claim 13, wherein
2 said docking assembly includes a pin that can be
3 inserted into an aperture of a plate that supports the
4 load.

1 15. The vibration isolator of claim 1, further
2 comprising a foot that supports said active and passive
3 isolator assemblies and which has a cleat that can be
4 embedded into the floor surface.

1 16. A method for isolating a load from a floor,
2 comprising:

- 3 a) actively isolating the load in a first
4 direction; and,
5 b) passively isolating the load in a second
6 direction.

1 17. A vibration isolator which isolates a load
2 that is separated from a floor, comprising:

- 3 an actuator that is coupled to the load and the
4 floor, said actuator having a center axis; and,
5 a sensor that is coupled to said actuator and the
6 load, said sensor having a center axis that is coaxial
7 with the center axis of said actuator.

1 18. The vibration isolator of claim 17, further
2 comprising a controller which is coupled to said
3 actuator and said sensor and which provides a drive
4 signal to said actuator in response to a feedback
5 signal from said sensor.

1 19. The vibration isolator of claim 18, wherein
2 said drive signal is a function of a transfer function
3 and said transfer function is selectable from a
4 plurality of different transfer functions.

1 20. The vibration isolator of claim 17, further
2 comprising a filter assembly that is coupled to said
3 sensor and the load.

1 21. The vibration isolator of claim 20, wherein
2 said filter assembly includes a profiled elastomer that
3 is located within a profiled cavity of a coupler plate,
4 so that a resonant frequency of said filter assembly is
5 essentially constant for a predetermined range of loads
6 applied to said filter assembly.

1 22. The vibration isolator of claim 21, wherein
2 said profiled elastomer and profiled cavity each have a
3 conical shape.

1 23. The vibration isolator of claim 17, further
2 comprising a docking assembly that secures the load
3 relative to the floor.

1 24. The vibration isolator of claim 23, wherein
2 said docking assembly includes a pin that can be
3 inserted into an aperture of a plate that supports the
4 load.

1 25. A vibration isolator which isolates a load
2 that is separated from a floor, comprising:

3 an active isolator assembly that provides active
4 isolation of the load; and,
5 a docking assembly that secures the load relative
6 to the floor.

1 26. The vibration isolator of claim 25, wherein
2 said docking assembly includes a pin that can be
3 inserted into an aperture of a plate that supports the
4 load.

1 27. The vibration isolator of claim 26, wherein
2 said docking assembly includes a stepper motor which
3 moves said pin into said aperture.

1 28. The vibration isolator of claim 26, wherein
2 said active isolator assembly includes an actuator that
3 is coupled to the load and the floor, a sensor that
4 senses a movement of a point between the load and the
5 floor, and a controller which is coupled to said
6 actuator and said sensor and which provides a drive
7 signal to said actuator in response to a feedback
8 signal from said sensor.

1 29. The vibration isolator of claim 28, wherein
2 said drive signal is a function of a transfer function
3 and said transfer function is selectable from a
4 plurality of different transfer functions.

1 30. The vibration isolator of claim 28, wherein
2 said sensor has a center axis that is coaxial with a
3 center axis of said actuator.

1 31. A method for isolating and securing a load to
2 a floor, comprising:

3 a) actively isolating the load from the floor;
4 and,

5 b) activating a pin which couples and secures the
6 load to the floor.

1 32. The method as recited in claim 31, wherein the
2 pin is inserted into an aperture of a plate that
3 supports the load.

1 33. A vibration isolator which isolates a load
2 that is separated from a floor, comprising:
3 an actuator that is coupled to the load and the
4 floor;

5 a sensor that senses a movement of a point between
6 the load and the floor; and

7 a controller which is coupled to said actuator and
8 said sensor and which provides a drive signal to said
9 actuator in response to a feedback signal from said
10 sensor, said drive signal being a function of a

11 transfer function that is selectable from a plurality
12 of different transfer functions.

1 34. The vibration isolator of claim 33, further
2 comprising a passive isolator assembly that passively
3 isolates the load.

1 35. The vibration isolator of claim 34, wherein
2 said passive isolator assembly includes a pendulum
3 assembly.

1 36. The vibration isolator of claim 35, wherein
2 said pendulum assembly includes a cable that is coupled
3 to the load.

1 37. The vibration isolator of claim 35, wherein
2 said passive isolator assembly includes a dashpot that
3 is coupled to said pendulum assembly and the floor.

1 38. The vibration isolator of claim 33, wherein
2 said sensor has a center axis that is coaxial with a
3 center axis of said actuator.

1 39. The vibration isolator of claim 33, further
2 comprising a damper assembly that is coupled to said
3 sensor and the load.

1 40. The vibration isolator of claim 39, wherein
2 said filter assembly includes a profiled elastomer that
3 is located within a profiled cavity of a coupler plate,
4 so that a resonant frequency of said filter assembly is
5 essentially constant for a predetermined range of loads
6 applied to said filter assembly.

1 41. The vibration isolator of claim 40, wherein
2 said profiled elastomer and profiled cavity each have a
3 conical shape.

1 42. The vibration isolator of claim 33, further
2 comprising a docking assembly that secures the load
3 relative to the floor.

1 43. The vibration isolator of claim 42, wherein
2 said docking assembly includes a pin that can be
3 inserted into an aperture of a plate that supports the
4 load.

1 44. The vibration isolator of claim 39, further
2 comprising a foot that supports said actuator and said
3 sensor and which has a cleat that can be embedded into
4 the floor.

1 45. A method for isolating a load from a floor,
2 comprising:
3 a) selecting a transfer function from a plurality
4 of different transfer functions;
5 b) sensing a motion between the load and an
6 inertial reference; and
7 c) driving an actuator with a drive signal that
8 is a function of the selected transfer function.

1 46. The method of claim 45, wherein the transfer
2 function is selected by storing the transfer function
3 in a memory device.

1 47. A foot for a vibration isolator that isolates
2 a load from a floor, comprising:
3 a plate; and,
4 a cleat that extends from said plate and can be
5 embedded into the floor.

1 41. A vibration isolator which isolates a load
2 that is separated from a floor, comprising:
3 an active isolator assembly that provides active
4 isolation of the load; and,
5 a plate that is coupled to said active isolator
6 assembly; and,

7 a cleat that extends from said plate and can be
8 embedded into the floor.

1 49. The vibration isolator of claim 48, further
2 comprising a passive isolator assembly that provides
3 passive isolation of the load.